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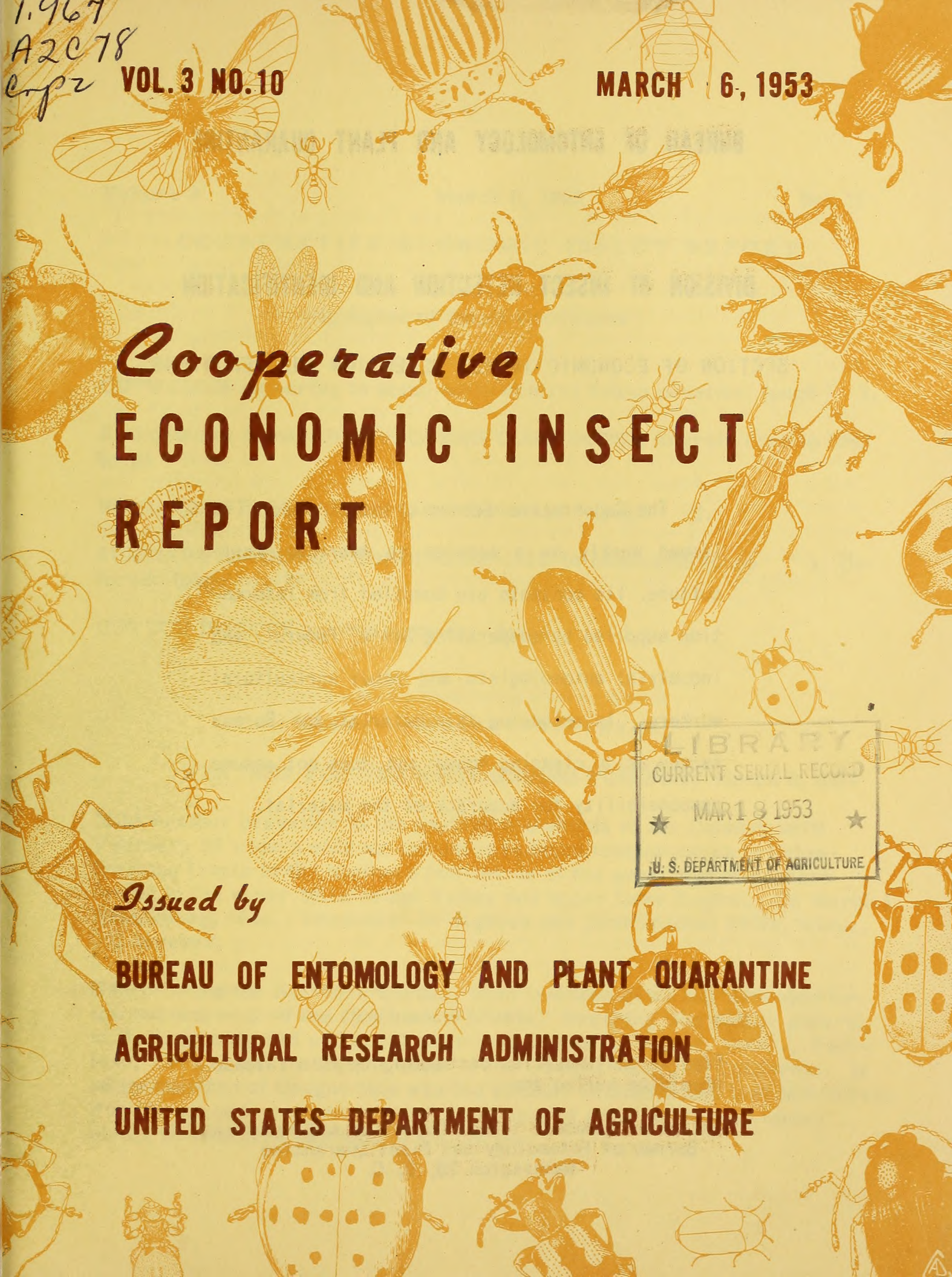

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VOL. 3 NO. 10 MARCH 6, 1953

Cooperative ECONOMIC INSECT REPORT

Issued by

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

AGRICULTURAL RESEARCH ADMINISTRATION

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BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

DIVISION OF INSECT DETECTION AND IDENTIFICATION

SECTION OF ECONOMIC INSECT DETECTION AND REPORTING

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Bureau serves as a clearing house and does not assume responsibility for accuracy of the material.

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Bureau of Entomology and Plant Quarantine
Washington 25, D. C.

Volume 3 March 6, 1953 No. 10

COOPERATIVE ECONOMIC INSECT REPORT

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WEATHER FOR THE WEEK ENDING TUESDAY, March 3, 1953

Mild weather prevailed in the eastern two-thirds of the Country until February 28 when a cold air intrusion reduced temperatures to below-freezing levels in the northern two-thirds of the area, and to subzero levels in the upper Mississippi Valley and upper Lake Region. On March 1 Grantsburg, Wis., recorded -25 degrees and International Falls, Minn., -21 degrees.

Except along the Northern Border, temperatures generally averaged below normal west of the Continental Divide. Freezing was rather general at the beginning and end of the period occurring at Seattle, Wash., Portland, Oreg., and throughout most of the Central Valley of California. In many sections of Oregon this was the coldest weather since last November. For the second consecutive week frost caused some damage to tender plants in scattered sections of California.

Precipitation fell in the eastern half of the Country at the beginning of the week and virtually all sections at the end. During the latter period moderate to heavy snowfall occurred in the north-central interior and heavy rains with thunderstorms in many southern sections. Weekly totals ranged from one-half to more than an inch in much of Arizona, Montana, Kansas, Oklahoma, Missouri, Arkansas, Louisiana, and also in the States east of the Mississippi and south of the Ohio River except Florida. In Arizona water supplies and soil moisture are now adequate, and snow accumulations in the mountains were increased by 12 to 18 inches. From the lower Mississippi Valley to the Atlantic Coast soil moisture is adequate, and in many sections the ground is too wet to work. Some rivers were flooding in southern Alabama after the heavy rains at the end of the period. In the lower Great Plains precipitation benefited small grains and improved surface soil conditions, but was not sufficient to penetrate to the subsoil where moisture is still critically short. (Summary Supplied by U.S. Weather Bureau)

* *

WEATHER BUREAU'S 30-DAY OUTLOOK

March 1953

The Weather Bureau's 30-day outlook for March calls for temperatures to average below seasonal normals west of a line extending from the eastern Lake Region through central Texas with the exception of the Pacific Northwest where near normal temperatures are indicated. Above normal temperatures are predicted for the Southeast and near normal for the Northeast.

Precipitation amounts are predicted to exceed normal over the central part of the nation from the Gulf of Mexico to the Canadian border. Seasonally normal amounts are expected elsewhere except for subnormal in the Pacific Northwest.

* This report released by the Weather Bureau on February 27.

A more detailed weather outlook - Average Monthly Resume and Outlook - is prepared by the Weather Bureau. To subscribe to this publication address application, with P. O. money order or check payable to Treasurer of the United States, and mail to Superintendent of Documents, Government Printing Office, Washington 25, D. C. Subscription price is $4.80 per year or $2.40 for six month, postpaid; minimum subscription six months.

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CEREAL AND FORAGE INSECTS

Wheat Pest Conditions in Cottle, Childress, Wichita, Hardeman, and Wilbarger Counties, TEXAS - CUTWORMS are beginning to appear in fields that were thought to be relatively free of these pests two to three weeks ago. Many acres have been sprayed and spraying continuing. SPIDER MITES can be found in most of the fields in all the counties except Wichita. Very few fields heavily enough infested at present to cause undue alarm but populations sufficient for build-up if favorable conditions occur. No GREENBUG (Toxoptera graminum) has been found in this area as yet in 1953. (Extension Ser. Crop Rept., Feb. 23).

BUDWORMS-TEXAS-Found in sufficient numbers in many fields of corn to warrant control measures in Lower Rio Grande Valley. (Wene & Griffith)

ESTIMATES OF DAMAGE BY THE EUROPEAN CORN BORER TO GRAIN CORN IN THE UNITED STATES IN 1952

Compiled by E. W. Beck

The 1952 loss of grain corn due to damage by the European corn borer (Pyrausta nubilalis.) is estimated to be 53, 270, 000 bushels, or 1.7 percent of an estimated national crop of 3, 001, 797, 000 bushels. The estimated crop loss value is $77, 205, 000, when computed, with exceptions shown in table 1, on the basis of prices 1/ received by farmers as of December 15, 1952. The estimates were made for 963 counties in 25 States and include 64 percent of all counties known to be infested in the United States.

The estimated production, value of production, and crop losses for counties included in the estimates are given in table 1.

The estimates are based on fall borer populations determined by surveys by State agencies 2/ in 728 counties in 25 States. Damage estimates were computed for 235 more counties than surveyed by applying population averages within a district and averages of adjoining or nearby counties to counties that were not surveyed. The index of 3 percent loss per borer per plant was used generally in computing estimates of loss. In some instances the estimated losses were adjusted downward because of the high proportion of immature larvae reported in the surveys.

Production data 3/ utilized were reported by the Crop Reporting Board of the Bureau of Agricultural Economics. District and county production data were not available for 1952 and were estimated by proportioning 1952 total production according to proportions of production reported in recent years.

1/ U. S. Bureau of Agricultural Economics. Agricultural Prices. Prices Down 3 percent. Parity Ration Lowest Since April 1950. December 30, 1952.

2/ Beck, E. W. Status of the European Corn Borer in 1952. U. S. Bur. Ent. & Plant Quar., Cooperative Economic Insect Report, Vol. III, No. 7, pp. 93-112, February 13, 1953.

3/ U. S. Bureau of Agricultural Economics. Acreage, Yield and Production of Principal Crops. December 17, 1952.

Table 1. Estimates of damage by the European corn borer to corn grown for grain in the United States in 1952

State	Counties		Estimated data				
	Known to be infested[1]	Included in estimate	Production	Value of bushel	Value of production	Loss of crop	
	Number	Number	1,000 Bu.	Dollars	1,000 Dol.	1,000 Bu.	1,000 Dol.
Connecticut	8	8	200	1.90	380	1	2
Delaware	3	3	6,270	1.54	9,656	265	408
Illinois	102	102	501,352	1.52	762,055	8,777	13,341
Indiana	92	92	225,100	1.49	335,399	1,322[2]	1,969[2]
Iowa	99	99	676,160	1.41	953,386	21,191[3]	29,879[3]
Kansas	88	36	30,890	1.55	47,880	537	832
Kentucky	92	24	15,171	1.68	25,487	898	1,509
Maryland	23	23	19,458	1.61	31,327	502	808
Massachusetts	14	1	1	1.90	2	Trace	-
Michigan	50	21	39,640	1.48	58,667	108	160
Minnesota	87	81	230,941	1.35	311,770	6,953	9,386
Missouri	91	70	116,077	1.49	172,955	784	1,168
Nebraska	83	44	187,926	1.55[2]	291,285	1,682[2]	2,607[2]
New Hampshire	9	9	82	1.90	156	1	2
New Jersey	21	21	7,612	1.70	12,940	128	218
New York	60	11	3,368	1.65	5,557	19	31
North Dakota	42	16	5,805	1.37	7,953	26	36
Ohio	87	87	178,000	1.65[2]	293,700	1,958[2]	3,230[2]
Pennsylvania	67	67	52,626	1.65	86,833	1,166	1,924
Rhode Island	5	5	44	1.90	84	1	2
South Dakota	57	47	91,230	1.37	124,985	5,905	8,090
Vermont	14	14	84	1.90	160	Trace	-
Virginia	69	8	4,157	1.74	7,233	138	240
West Virginia	49	3	419	1.79	750	Trace	-
Wisconsin	71	71	90,840	1.50[2]	136,260	908[2]	1,363[2]
Total	1,383	963	2,483,453	-	3,676,860	53,270	77,205

[1] Does not include 121 counties in 12 other States for which no estimates were made.

[2] Estimate provided by State; value of bushel differs from December 15 price received by farmers.

[3] State estimate of damaging population utilized in computing loss.

FRUIT INSECTS

PEAR PSYLLA (Psylla pyricola)-OREGON-Eggs found on pear twigs at The Dalles, February 25. (J. E. Davis).

TRUCH CROP INSECTS

VEGETABLE WEEVIL (Listroderes costirostris obliquus)-ALABAMA-Damaging turnips in Monroe, Conecuh and Escambia Counties, February 23. (C. L. Stanford). VIRGINIA-Larvae continues feeding lightly on experimental spinach and old crucifers in home gardens in Norfolk area. (Brubaker, Greenwood, Hofmaster).

YELLOW-MARGINED LEAF BEETLE (Microtheca ochroloma)-ALABAMA-Infesting turnips in Mobile and Baldwin Counties, Feb. 23. (C. L. Stanford).

APHIDS (Aphidae)-VIRGINIA-Populations appear to be building up on kale and spinach in the Norfolk area. (Brubaker, Greenwood, Hofmaster).

SEED-CORN MAGGOT (Hylemya cilicrura)-MISSISSIPPI-Large numbers feeding on garden peas, onions and sprouting seed in Adams County. (R. E. Hutchins). Adults, possibly this species, unusually abundant in Leland district, February 20. (D. F. Young)

LEAF MINERS-TEXAS-Very abundant in seedling cantaloupes in Lower Rio Grande Valley. Damaging tomatoes in many fields. (Wene and Griffith).

COTTON INSECTS

CUTWORMS (Phalaenidae)-TEXAS-Causing some damage in a number of cotton fields in the Lower Rio Grande Valley. (Wene and Griffith).

Boll Weevil Hibernation in the Carolinas

SOUTH CAROLINA (Additional notes from Florence County) - The population of the boll weevil (Anthonomus grandis) that entered hibernation has been studied over a 10-year period in Florence County, South Carolina. With the exception of 1949, the number of weevils found in hibernation in this county in 1952 was the highest since fall counts were started in 1942. Examination of 440 square yards of surface trash collected from areas adjacent to cotton fields on 44 farms showed that boll weevils were found in hibernation at the high rate of 6259 per acre of surface trash. (The number 8,113 boll weevils per acre for Florence County shown in C.E.I.R., Vol. 3, No. 9, page 134 was based on data obtained from examinations on only 30 farms). The average number of weevils found in hibernation in Florence County for the past ten years during the fall is 4642 per acre; therefore, there were 34.8 percent more weevils found in the fall of 1952 than the 10-year average. The winter has been mild and it is likely that the weevils will survive in large numbers.

NORTH CAROLINA - Surface trash examinations were made in 6 counties during January 1953. The average number of boll weevils found per acre in these counties is: Rowan 4743, Lee 2323, Scotland 5227, Hoke 3969, Robeson 3388, Sampson 3872. No previous records available with which to compare results of surface trash examinations made in January in this State.

At the present time prospects are for heavy boll weevil infestations in the Carolinas; however, weather conditions during June and July will largely determine how serious the weevil problem will be in 1953. (L. C. Fife).

INSECTS AFFECTING MAN & ANIMALS

CATTLE LICE -UTAH-Over 9,000 cattle sprayed this winter in Cache and Washington Counties for lice control. Cattle reported rather heavily infested in Blanding area, San Juan County. (G. F. Knowlton).

CATTLE GRUB (Hypoderma sp.)-UTAH-During the past 10 days cattle grubs have been appearing in backs of cattle in many counties of northern and central Utah. (February 10). Began appearing in cattle in November 1952 and continuing in Washington County. About 300 cattle treated. (Knowlton and Burningham).

FOREST INSECTS

GYPSY MOTH CONTROL IN CONNECTICUT - 1952

(Summary of work done by Connecticut Agricultural Experiment Station in the generally infested area during the period November 1, 1951 to

October 30, 1952. Does not cover BEPQ control activities conducted in the suppressive area).

For several years emphasis has been on prevention of defoliation of woodland. This has been carried out by (1) making maps of types of woodland in each town, (2) scouting those areas having woodland susceptible to heavy infestations of gypsy moth (Porthetria dispar), and (3) spraying those areas in which infestation was severe enought to threaten complete defoliation of trees. Maps of the types of woodland have been completed for 74 of the 169 towns in the State, and partially completed for two other. With the exception of East Haddam, the entire area east of the Connecticut River has been completed. Sixteen towns in Hartford and Litchfield Counties, west of the Connecticut River, have been mapped. During the year 986,761acresof woodland in 7 counties were scouted, resulting in the finding of over 19 million egg masses. Most severe infestation (over 13 million egg masses on 6,940 acres) was found in 7 towns in Hartford, New Haven and Middlesex Counties.

Approximately 1,757 single trees were sprayed in 27 towns. In addition, mist blowers were used on 1,757 acres, and aircraft sprayed about 6,940 acres. One block of 340 acres was sprayed by the Middletown Water Board.

Some 1,087 acres of woodland were 75 percent or more defoliated by gypsy moth in 1952. Most of this defoliation occurred on margins of sprayed areas.

Funds for spraying were insufficient to allow spraying of the entire area. At the same time a very high survival of eggs (74 percent) and a complete absence of diseases of the larvae resulted in greater damage than in many seasons.

During the year 12,000 puparia of the parasite Compsilura concinnati were obtained from 20,000 gypsy moth larvae collected from the town of Thompson. Nine thousand of these puparia were delivered to Forest Insect Investigations, BEPQ, and 3,000 were released in the town of Meriden. (O. B. Cooke).

SUMMARY OF INSECT CONDITIONS - 1952

MINNESOTA

Compiled by J. W. Butcher

Insects Affecting Forage and Field Crops: The fall EUROPEAN CORN BORER (*Pyrausta nubilalis*) survey showed the State average to be eighty-nine borers per 100 plants as compared with 56 in the fall of 1951. Of the 81 counties surveyed, 51 counties had higher borer counts in the fall of 1952 than in 1951. The counties south of a line joining St. Paul, St. Cloud, Alexandria and Breckenridge had counts averaging over 100 borers per 100 plants. As of October 15, 1952, 59% of the borers were in the fifth or last larval stage; twenty per-cent in the fourth; 19% in the third; and 2% in the second. 1952 Infestation Summary: The past summer was much more favoarble for the development of the European corn borer than was that of 1951. Ther percentage of first-brood borers emerging as second-brood adults was 38% in the southwest corn borer reporting district; 40% in the south central; 49% in the southwest; 48% in the west central; and 48% in the east central. This represents the largest second brood since 1949. A co-operative survey conducted in 27 counties of Minnesota for the presence of a micro-organism (*Perezia pyraustae*) which causes a disease of corn borer larvae, pupae, and adults showed the organism to be widely distributed in the State. Additional studies on its importance will be made in 1953. 1953 Outlook: Although the 1952 fall borer count of 89 per 100 plants is considerably higher than the 56 count of 1951, the percentage of the borers in the fifth, or fullgrown stage, was only 59% in 1952 as compared with 89 % in 1951. This is important because immature borers do not survive the winter. There are sufficient numbers of mature, overwintering corn borers, however, to cause considerable loss in 1953 if weather conditions are favorable for corn growth and borer survival. (Rept. by J. R. Sandve). Unfavorable weather conditions during the spring and early summer of 1952 postponed hatching of all species of GRASSHOPPERS. Nymphal development was slow and heavy mortality occurred at various times in several areas of the State. The following species in order of severity of infestation were found throughout the State: *Melanoplus femur-rubrum*, *M. bivittatus*, *M. mexicanus*, and *Camnula pellucida*. Except for a few alfalfa fields, crop damage was very light, ther being no flights and only a slight foot movement from marginal hatching beds into filsds. All egg surveys show infestations ranging from non-economic to light forecasting only scattered light infestations for 1953. (Rept. by C. Pearson)

CUTWORMS are scattered throughout the southern half of the State. A special cutworm survey indicated that the heaviest concentrations were found feeding on flax in the south central and southwestern part of the State. DARK-SIDED CUTWORM (*Euxoa messoria*) was the most numerous of those collected in the survey. Other species collected were STRIPED CUTWORM (*Euxoa tessellata*), DINGY CUTWORM (*Feltia sp.*) and SPOTTED CUTWORM (*Amathes c-nigrum*). ARMYWORM (*Pseudaletia unipuncta*) was present in outbreak numbers in southeastern Minnesota. Greatest numbers found southeast of the line drawn from St. Paul to Mankato to Fairmont. Late-planted small grains, corn, soy beans and flax were attacked. Most infestations began in lodged green grains, in densely foliated meadows, wild dense grassland, and marshy or swampy areas. (Rept. by J. Hayward)

LYGUS BUGS were more abundant in Minnesota during 1952 than in the several preceding years. Control of these insects on alfalfa grown for seed increased seed yields up to 300%. Lygus bugs of the second generation were numerous, and adult bugs were very abundant in the fall. ALFALFA PLANT BUG (*Adelphocoris lineolatus*) was moderately abundant as in 1951. During the last few years, this insect has been much less important than during the early 1940's. POTATO LEAFHOPPER (*Empoasca fabae*) caused severe injury to alfalfa during July and August in the southern half of Minnesota and as far north as Grand Rapids. A CLOVER SEED WEEVIL (*Miccotrogus picirostris*) was somewhat more abundant on alsike clover in northern Minnesota than during 1950 and 1951. Examination of maturing seed pods indicated that this weevil was responsible for a 15% to 20% seed loss in unsprayed alsike clover. LESSER CLOVER LEAF WEEVIL (*Hypera nigrirostris*) became locally abundant in some fields of alsike clover in northern Minnesota. A minor outbreak of the THRIPS (*Haplothrips niger*) occurred on alsike clover in a small area near Baudette. Adult thrips averaged 80 per flower head in one field, and caused severe injury to the alsike clover florets. Several counties reported SWEETCLOVER WEEVIL (*Sitona cylindricollis*) injury to seedlings of sweet clover in 1952. There was, undoubtedly, considerable loss in sweet clover stands due to the weevil in other counties that did not report. Losses of new seedings of both sweet clover and alfalfa due to weevil feeding ranged from only slight injury to complete loss of stand. Special attention is called to the observation that sweetclover weevil injures new seedings and established stands of alfalfa. Although weevil injury to alfalfa has been reported in the literature, the potential and actual destructiveness of sweetclover weevil to alfalfa stands does not appear to be generally recognized. (Rept. by B.A. Haws)

Apple Insects: APPLE CURCULIO (*Tachypterellus quadrigibbus*) appears to be limited in distribution to the extreme southeastern corner of Minnesota. Emergence and early activity of overwintering adults was affected by adverse weather and many beetles were still active when the new generation was beginning to emerge. Normal control sprays did not adequately cover this prolonged period of activity, and consequently the population increased. Fall feeding on mature fruits caused serious losses in some orchards. A fall survey of commercial orchards in this area of the State showed that apple curculio damaged 5% of tree-run apples and 11% of drops. PLUM CURCULIO (*Conotrachelus nenuphar*) populations and consequent injury increased over the State. Every neglected or poorly sprayed orchard was badly infested. Commercial orchards averaged 3% tree-run losses of mature fruit. CODLING MOTH (*Carpocapsa pomonella*) increased slightly in 1952, but in most commercial orchards did not cause noticeable losses. First generation adults emerged June 9 at Faribault and continued active until July 10. Second generation moths were observed on August 14th. Weather conditions were favorable for the second generation, and a population increase occurred here. Commercial orchards averaged 2% tree-run loss of mature fruit.

APPLE MAGGOT (*Rhagoletis pomonella*) populations in most orchards were slightly higher in 1952, but considerably lower than the peak of 1950. Adult flies emerged July 8th at Princeton and July 9th at Howard Lake, which is average time. However, prolonged emergence and activity occurred as it has for the past three years, resulting in a large number of flies present and active after picking had started and spraying had stopped. Commercial orchards averaged 3% loss of mature tree-run fruit. A spot check survey showed two species of MITES, *Metatetranychus ulmi* and *Tetranychus bimaculatus* infesting some apple orchards and causing noticeable damage. More information regarding mites will be forthcoming in 1953. (Rept. by W. O. Bulger and T. T. Aamodt)

Vegetable Insects: POTATO LEAFHOPPER (*Empoasca fabae*) was abundant, as usual, during July and August on potatoes and legumes in the southern half of Minnesota and as far north as Grand Rapids. LYGUS BUGS caused moderate injury to potatoes in the Bagley and Grand Rapids areas. ONION MAGGOT (*Hylemya antiqua*) and CABBAGE MAGGOT (*Hylemya brassicae*) were unusually abundant in truck crop areas near the Twin Cities. SPINACH LEAF MINER (*Pegomya hyoscyami*) appeared to be nearly as abundant in some spinach fields of the Hollandale area as in 1951, but use of insecticides kept the injury at a minimum.

Insect Pests of Nursery and Landscape Stock: SCALE INSECTS were apparent in greater numbers on landscape stock in Minneapolis and St. Paul areas in 1952. *Lecanium corni* and *Pulvinaria vitis* were most frequently present in the infestations. Although the scales were widespread, it was apparent areas sprayed with DDT for mosquito control were more heavily infested than those that were not so sprayed. An exotic species of *Lecanium* was found present on roses in the State. This particular infestation was completely suppressed. Other scale insects which were reported but were of minor consequence were pine needle scale, San Jose scale and scurfy scale. There were the usual reports of aphids on apples and plums; and aphids on gladioli and delphinium. GLADIOLUS THRIPS (*Taeniothrips simplex*) were very difficult to control during the year. There appears to be a very unusual and heavy increase of this species in plantings. This was attributed in part to the fact that frequent rains occurred at blossom time and washed away toxic residues of previously applied insecticides. EUROPEAN RED MITE (*Metatetranychus ulmi*), TWO-SPOTTED SPIDER MITE (*Tetranychus bimaculatus*) and another spider mite, *Tetranychus telarius* were present in large numbers in most deciduous and coniferous stock. CYCLAMEN MITE (*Tarsoneinus pallidus*)was found present on many everbearing varieties of strawberry plants and to some extent on various herbaceous perennials. CUTWORMS partially destroyed a large planting of *Prunus* seedlings in the Southwestern section of the State. (Rept. by W. P. Trampe and G. W. Nelson)

Forest Insect Conditions in 1952: The most important forest insect in Minnesota in 1952 was the FOREST TENT CATERPILLAR (*Malocosoma disstria*). An estimated 15 million acres of land area were infested throughout the northern part of the State. There was a recession of the 1951 infestation intensity in the vicinity of Leech Lake in parts of Hubbard and Cass Counties in 1952 as a result of heavy starvation of caterpillar larvae in that area in 1951. In general, however, the infestation was considerably more severe throughout the area that had been infested previously and extended over a considerably larger area in 1952. The predictions for 1953 indicate an expected infestation of approximately twenty-six million acres. It is expected that the infestation will be somewhat lighter in the Leech Lake area and in parts of Crow Wing County and southern Cass County where starvation had again been an important limiting factor in 1952. For the most part, the same areas that were infested in 1952 will be similarly affected in 1953, and a considerably larger acreage extending in all directions from the older infestation will be infested next year, also. A very successful control operation was undertaken by individual home owner and private property owners in 1952. The second major insect in Minnesota in 1952 was the LARCH SAWFLY (Pristiphora erichsonii). It is estimated that at least a half million acres of Minnesota tamarack was infested in some degree in 1952. There is no appreciable evidence that extensive tree mortality is imminent as a result of the continuing infestation; however, there are increasing scattered signs of EASTERN LARCH BEETLE (Dendroctonus simplex) injury to trees throughout the infested area. In most cases, such attacks by bark beetle are associated with high water levels or some other factor or factors which apparently are abetting the injury caused by the sawfly. There is no conclusive evidence as yet that the sawfly alone is predisposing tamarack to bark beetle attack. It is expected that the larch sawfly infestation will proceed much as it has in the last two years and no appreciable extension of the infestation is anticipated. LARCH CASEBEARER (Coleophora laricella) which was reported from St. Louis and Anoka Counties in 1950 and 1951 apparently persisted at relatively low infestation level throughout much the same area as previously. These infestations appear to be confined to relatively small local areas. Two sawflies on conifers were of importance or promised to be important in the immediate future throughout the south and southeastern part of the State in 1952. One of these, the INTRODUCED PINE SAWFLY (Diprion smile), was responsible for heavy defoliation of white pine along roadside plantings and in plantations. The extremely scattered and frequent nature of the reports of this insect indicate that it will be a serious problem in 1953. RED-HEADED PINE SAWFLY (Neodiprion lecontei) was present and injurious in at least five east central counties. This insect has been at a relatively low level for a number of years and its appearance at so many different points suggests a general resurgence. (Rept. by J. W. Butcher)

COLORADO

Reported by L. B. Daniels

Cereal and Forage Insects: CORN EARWORM (Heliothis armigera) caused 15 to 25 percent damage to corn and tomatoes in Arkansas Valley; 30 to 40 percent on Western Slope. ALFALFA WEEVIL (Hypera postica) caused approximately 10 percent loss to alfalfa in Northwestern Colorado, 2 percent loss in San Juan Basin and Western Slope and 25 percent loss in Northeastern Colorado. SAY PLANT BUG (Chlorochroa sayi) caused about 2 percent loss to small grains, particularly barley, over the State. From general observations this insect probably migrated into the State from southern breeding areas. Large numbers appeared during June in the agricultural areas.

Also observed in several instances in mountainous sections. PALE WESTERN CUTWORM (Agrotis orthogonia) and ARMY CUTWORM (Chorizagrotis auxiliaris) caused serious damage in some fields of small grains, in both eastern and western areas. CLOVER SEED CHALCID (Bruchophagus gibbus) damage to alfalfa was about 25 percent in Phillips and Yuma Counties. Drought conditions overshadowed injury in the Arkansas Valley.

Fruit Insects: CODLING MOTH (Carpocapsa pomonella)- Fifteen percent over-all damage reported from Western Slope apple area. Infested fruit as high 30 percent in some orchards. Moth emergence extended over 40 days because of erratic weather conditions. This factor partially responsible for increase.

Vegetable Insects: BEET WEBWORM (Loxostege sticticalis) - First generation made spraying necessary. Second generation did not become serious. TUBER FLEA BEETLE (Epitrix tuberis) - Distinct second generation responsible for serious damage where late applications of insecticides were not applied in northeastern areas. A 3 percent over-all damage estimated in some fields with 20 percent heavy "worm" tracks. BEET LEAFHOPPER (Circulifer tenellus) - Tomatoes in western Colorado were estimated as showing 20 percent Western Yellow Blight infection (curly top of sugar beets). Many fields had as high as 60 percent. Sugar beet fields, even those planted with resistant varieties, had more serious curly top symptoms.

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Additional UTAH summary note: CLOVER SEED CHALCID (Bruchophagus gibbus) caused an estimated $339,000 loss to Utah alfalfa seed growers in 1952. This estimate is based on extensive sampling in the major seed areas. First crop infestation average 19.1 percent in the Delta (Millard County) seed area, while second crop averaged 13.8 percent infested. Infestation was substantially lower in Duchesne and Unitah Counties in 1952, and apparently lower for the State as a whole than during 1951 or 1950. (Lieberman and Knowlton).

SURVEY METHODS

COTTON INSECTS

The following suggested methods for making uniform cotton insect surveys were formulated at the Cotton Insect Research and Control Conference held in Memphis, Tennessee, December 7-9, 1952. It was agreed at the conference that these methods are not final but would serve as a guide in the development of standardized survey procedures. After this season's work these procedures will be reviewed and suggested improvements incorporated.

Boll Weevil (Anthonomus grandis)

Survey records are made in a number of States to determine the winter survival of the boll weevil. Counts are made in the fall soon after weevils enter hibernation and again in the spring before they emerge from winter quarters. A standard sample is 2 square yards of surface woods trash taken from the edge of a field where cotton was grown during the season. At least five samples are taken from a field.

In most States boll weevil population counts are made on seedling cotton to determine the number of weevils entering cotton fields from hibernation quarters. The number per acre is figured by examining the seedling plants on 50 feet of row in each of five representative locations in the field. Additional counts are desirable in large fields.

Examination for boll weevils are made weekly after the plants are squaring freely or have produced as many as three squares per plant. One hundred squares are examined while walking diagonally across the center of the field. The squares should be one-third grown or larger, and an equal number should be picked from the top, middle, and lower branches of the plants. Squares from the ground or dried-up squares that are "hanging" on the plant should not be picked.

An alternative method is to count about 25 squares in each of several locations distributed over the field. The percentage of infestation is determined by counting all squares that have egg or feeding punctures. However, the numbe of sample counts will depend upon the size of the field and the surrounding environment. Accurate infestation records in large fields will require additiona counts in different parts of the field.

Bollworm (Heliothis armigera)

Examinations for bollworm eggs on cotton are started when most of the corn silks begin to dry, or at the time bollworms usually appear, and are repeated every 5 days thereafter until the crop has matured.

Terminals (about 3 or 4 inches of the top of the cotton plant) of 100 main stems are examined for eggs and worms. When first deposited, the eggs are white and about the size of mustard seed. As hatching time nears, they change to a dirty white. These eggs usually will be found scattered on the terminal portions of the plant.

If eggs are found on the terminals and 4 or 5 young worms in small squares or on tender top leaves, infestation is high enough to start treatment. To obtain effective control, no time should be lost in applying poisons. Apply poison at 5-day intervals as long as necessary.

To determine the injury caused by this pest, the percentage of injured squares and bolls should be recorded at 5-day intervals. A sufficient number of squares and bolls should be examined to obtain adequate samples of a given field.

Cotton Aphid (Aphis gossypii)

The aphid infestation is classified according to the number of aphids estimated per leaf as follows:

Class 1 - 0
Class 2 - 1 to 10 per leaf
Class 3 - 11 to 25 per leaf
Class 4 - 26 or more per leaf

Beginning at the margin of the field and while walking diagonally across it, 100 leaves should be examined successively from near the bottom, near the middle, and near the top of the plants.

Cotton Fleahopper (Psallus seriatus)

Weekly inspections should be made as soon as the cotton is old enough to produce squares and should be continued until the crop is set and begins to mature. The main stem terminal bud of 100 cotton plants per field, including about 3 or 4 inches of the terminal bud or top of the cotton plant should be examined. Both adults and nymphs should be counted. The number per 100 terminals being recorded as the infestation for the field.

The examinations should be made at several representative points diagonally across a field, 33 terminal buds being inspected approximately 50 feet from each of the 2 corners and 34 terminal buds at the center of the field.

Cotton Leafworm (*Alabama argillacea*)

Two types of damage to the leaves are produced by the feeding of the cotton leafworm--(1) Semitransparent spots where newly hatched larvae are feeding on the lower surface of the leaf; and (2) ragging where larger larvae are eating through the entire leaf.

Numerous semitransparent spots, with small larvae present, indicate that a heavy infestation is developing. Three levels of infestation, based on the degree of ragging and the numberof larvae, are suggested:

Class 1 - Few leaves ragged and few larvae observed.
Class 2 - 2 to 3 leaves per plant 1/3 to 1/2 destroyed by ragging, and 2 to 3 larvae per plant.
Class 3 - Extensive damage to most leaves with 6 to 8 or more larvae per plant.

Pink Bollworm (*Pectinophora gossypiella*)

Bloom Infestation: After cotton has been blooming at least 5 days, pink bollworm infestation counts may be made on the basis either of the percentage of blooms infested or the number of worms per acre. To determine the percentage of blooms infested, record the number of infested and noninfested blooms of a representative number of blooms distributed over the field. To determine the number of worms per acre, step off 100 steps or 300 feet at each of five locations in the field or a total of 1,500 feet of row length and count the number of infested blooms on this area. The number of infested blooms multiplied by 10 will give the approximate worm population per acre.

Boll Infestation: While walking diagonally across the field, collect at random 100 green bolls that are hard or firm when pressed. Examine each boll as follows: Remove the bracts and calyx by cutting off a thin slice of the base of the boll; cut each section of the boll midway between the sutures so that each lock can be removed intact; examine the inside of the carpel for the characteristic tunnels or mines made by the young larvae. The number of bolls found infested represents the percentage of infestation.

Spider Mites (Tetranychus spp.)

Classify the infestation by estimating the number of adult females per leaf as follows:

Class 0 - No infestation
Class 1 - 1 to 10 per leaf
Class 2 - 11 to 25 per leaf
Class 3 - 26 or more per leaf

Beginning at the margin of the field and walking diagonally across it, examine 100 leaves or more taken successively from near the bottom, near the middle, and near the top of the plants.

* * *

Not included in the conference report are several cotton insect survey methods which have been developed. Three of these surveys follow:

Ground Trash Examinations for Boll Weevil

(As conducted at Tallulah, Louisiana)

Since 1936 trash examinations have been made in the Tallulah, Louisiana area in both fall and spring -- during the fall to determine the number of boll weevils entering hibernation; and during spring, the number which have survived. The so-called fall examination is usually made during the latter part of November and early December, or after temperatures which have forced weevils into hibernation. The spring examination is usually made during the latter part of February and early March. In making the examinations, ten 3 x 6 feet samples of surface trash, including about an inch of the topsoil, is carefully scraped up and placed in a bag from each location. The locations are selected near the edges (within 50 feet) of fields planted to cotton during the previous season. Approximately 20 locations, or fields, are sampled during both the fall and spring examinations. The samples are brought to the laboratory where they are run through a machine which is a modification of a soil sifter. This device divides the trash samples into three fractions; (1) very coarse material, consisting of leaves, twigs, etc.; (2) intermediate-sized particles of trash; (3) very fine material. The weevils are found in the intermediate sample. (R. C. Gaines).

Methods of Surveying for Pink Bollworm

(As used by Pink Bollworm Control Project, BEPQ)

The inspection of cotton for pink bollworm falls under four types or methods: the inspection of Blooms, Bolls, Debris and Gin Trash. Each method yeields information of a definite nature on the spread and intensity or build-up of the infestation at a certain point or period in the season, such information being the basis for quarantine and control measures.

Bloom Inspection: The method employed with this type of inspection is to make counts of the noninfested blooms and the infested blooms in a given field or part of a field, thus enabling the working out of the percent of infestation. With some experience, the inspector is readily able to detect the infested blooms by their rosetted appearance. Under usual conditions the rosetted, or infested, bloom remains closed, with the outer edges of the petal flared, after the noninfested bloom is open. By knowing the percent of the blooms infested, information is gained which indicates the previous winter's survival and the probable severity of the infestation for the growing season ahead, thus, forecasting the need for control measures. A 5% infestation in the early blooms is considered as forecasting economic damage.

Boll Inspection: The inspection of green cotton bolls for pink bollworm is performed for several specific purposes, such as, to keep abreast with the increase or decrease in infestation, to obtain information as to the effectiveness of control measures, and to locate spread to new areas where the inspection of gin trash is not practical; also, boll inspection is used to determine late season build-up or spread after harvest of the crop has been completed.

The usual method employed in the inspection of bolls is to examine twenty bolls from five representative points in the field, usually near each corner and the center. The percent is found on the 100 bolls examined. Ten percent to 12 percent infestation early in the season will probably cause economic damage. To detect the early stage of the larva in the boll, the boll is carefully cut and examined, first by removing the bracts by cutting off a small layer from the base of the boll, then cutting lengthwise of the boll midway between the sutures in such manner that when the boll is opened the lock will be whole and unbroken and the partitions or carpel walls between the locks will be undamaged by the cutting operation. Examine the inter-carpel lining for the characteristic tunnels or mines made by the small worm. The number of bolls found infested represents the percentage of infestation. The newly hatched larva is very difficult to see, but the damage caused is more noticeable. It enters the green boll immediately after hatching and moves toward the locks and seed, leaving a small thread-like brown "railroad", or tunnel, as it moves or burrows its way along the inside of the carpel. These railroads are characteristic work of the pink bollworm and are readily detected by the experienced inspector. In the later stage the larva is usually easily detected not only by the damage caused, but the larva itself is normally readily found when the boll is opened. When opening the boll the later stages of damage are detected by noting the small round clean-cut holes between the parition walls of the boll and the workings between the seed. If no damage is seen by this time the inspector does not generally cut the seed, but if damage is found, it may be necessary to cut the seed before actually locating the larva. A small round clean-cut hole is made in the outer wall of the boll only after the larva is mature and is preparing to leave the boll, or is preparing for moth emergence, where pupation takes place inside the boll which occasionally happens under certain climatic conditions. In late season the larva habitually seals itself inside a single seed or it pulls two seeds together to form "double seed." In the inspection of dry bolls or bollies, the method is much the same as the inspection of green bolls; however, this is late season inspection and the larva is expected to be mature, which makes necessary that more seed be cut in order to locate the larva sealed inside seed for weather protection during the overwintering stage. This type of inspection is done for the purpose of determining winter survival or mortality.

Debris Inspection: For inspection purposes debris is considered to be dry bolls, or parts thereof, consisting of pieces or parts of locks or seed cotton either on the soil surface or partly covered--this method also necessitates cutting considerable seed, and is conducted for the purpose of determining the effectiveness of stalk destruction and the effectiveness of different types of stalk cutters or shredders by determining the pink bollworm mortality. This method or type of inspection is also done for the purpose of determining winter carry-over in debris as compared to carry-over in bolls on the stalks or off of the soil surface.

Gin Trash Inspection: A machine has been developed by the Pink Bollworm Project which aids in the inspection of gin trash. This machine employs screens and air cleaners to reduce the trash samples to a residue containing pink bollworm, if any, all insects contained in the cotton trash which are of comparable size and weight of the pink bollworm, plus a small amount of leaf stems, grass seed and small clods of dirt. This means that it it possible for the inspector to inspect trash representing cotton from a large number of bales and many different fields in the period of a day. The greatest value developed from this method is the quicker detection, at a lower cost, of an initial infestation of pink bollworm in an area not previously known to be infested. A secondary value of this method is to trace light infestations to individual fields. The inspection of gin trash is also a quick and economically sound means of obtaining comparative data from year to year showing the increase or decrease of infestations. Due to varying factors in the cotton cleaning machinery at the gins this method does not yield results which can be translated as percent damage in the field. (Welker and West).

Estimate of Thrips Abundance

(Method used by BEPQ in Texas and Oklahoma)

Walk diagonally across the field making observations or inspections of many plants. If no thrips and damage are found, record none. If the newest unfolding leaves are showing only a slight brownish tinge along the edges and there is no silvering of the underside of these or older leaves, and if thrips are seen only occasionally, the damage should be recorded as light. If the newest leaves are showing considerable browning along the edges and some silvering is evident on the underside of all leaves, and thrips are readily found, record the damage as medium. If silvering of the leaves is readily noticeable, the terminal bud is showing injury, the general appearance of the plant is ragged and deformed, and thrips are numerous, then record the damage as heavy. A few thrips, uncontrolled, may quickly develop into a serious, damaging infestation. (Div. of Insects Affecting Cotton and Other Fiber Plants, Waco, Texas Station).

pink bollworm stage, all insects contained in the cotton trash, which are of comparable size and weight of the pink bollworm, plus a small amount of leaf stems, grass seed and small chunks of dirt. This means that it is possible for the inspector to inspect trash representing cotton from a large number of bales and many different fields in the period of a day. The greatest value derived from this method is the quicker detection at a lower cost, of an initial infestation of pink bollworms in an area not previously known to be infested. A secondary value of this method is to throw light on infestations in individual fields. The inspection of gin trash is also a quick and economically sound means of obtaining comparative data from year to year showing the increase or decrease of infestation. Due to varying factors in the cotton cleaning machinery at the gins, this method does not yield samples which can be translated to percent damage in the field. (Walton and Scott).

Estimate of Thrips Abundance
(Method used in N. W. Texas and Oklahoma)

Walk diagonally across the field making observations on the terminal buds of many plants. If no thrips and damage are found, record none. If the younger unfolding leaves are showing only a slight browning along the edges and there is no silvering of the underside of these or older leaves, and if thrips are seen only occasionally, the damage should be recorded as light. If the younger leaves are showing considerable browning along the edges and some silvering is evident on the underside of all leaves, and thrips are readily found, record the damage as moderate. If silvering of the leaves is readily noticeable, the terminal bud is showing injury, the general appearance of the plant is ragged and deformed, and thrips are numerous, then record the damage as heavy. A few thrips, uncontrolled, may quickly develop into a serious, damaging infestation. (Div. of Insects Affecting Cotton and Other Fiber Plants, Waco, Texas Station).

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Issued by

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AGRICULTURAL RESEARCH ADMINISTRATION

UNITED STATES DEPARTMENT OF AGRICULTURE